

PROJECT facts

U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY

Sequestration

08/2004



CO₂ SEQUESTRATION POTENTIAL OF TEXAS LOW-RANK COALS

Background

Fossil fuel combustion is the primary source of emissions of carbon dioxide (CO₂), a major greenhouse gas. Sequestration of CO₂ by injecting it into geologic formations, such as coal seams, may offer a viable method for reducing atmospheric CO₂ emissions. Injection into coal seams has the potential added benefit of enhanced coalbed methane recovery. The potential for CO₂ sequestration in low-rank coals, while as yet undetermined, is known to differ significantly from that for bituminous coals. To evaluate the feasibility and the environmental, technical, and economic impacts of CO₂ sequestration in Texas low-rank coal beds, the Texas Engineering Experimental Station is conducting a two-year study to characterize coals located near major electrical power plants. Potential CO₂ sequestration sites have been identified in coals near three Texas power plants. These power plants emit over 30 million metric tons of CO₂ annually, accounting for nearly 15 % of Texas' point-source emissions.

It has been widely reported that coals will adsorb approximately twice as much CO₂ as methane, but tests of a limited number of samples from the Northern Great Plains and Texas indicate that low-rank coals may adsorb 6-18 times as much CO₂ as methane. CO₂ injection can improve methane recovery and help maintain reservoir pressure, thus offsetting operating costs by reducing the amount of gas compression required.

CONTACT POINTS

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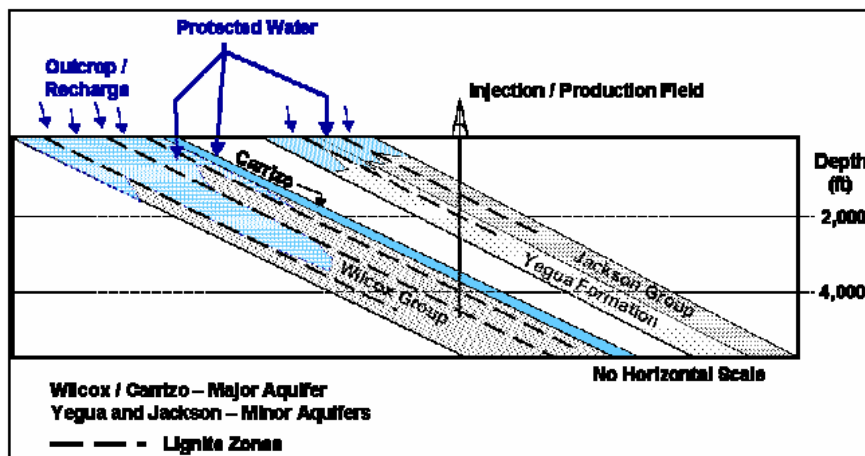
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*Schematic presentation of multizone sequestration/
production potential at some sites.*



CUSTOMER SERVICE

1-800-553-7681

WEBSITE

www.netl.doe.gov

PARTNERS

Texas Engineering
Experiment Station

COST

Total Project Value
\$450,000

DOE/Non-DOE Share
\$360,000/\$90,000

Primary Project Goal

The primary goal this project is to evaluate the feasibility and environmental and economic impacts of sequestration of CO₂ in Texas low-rank coal seams.

Objectives

Specific project objectives are to:

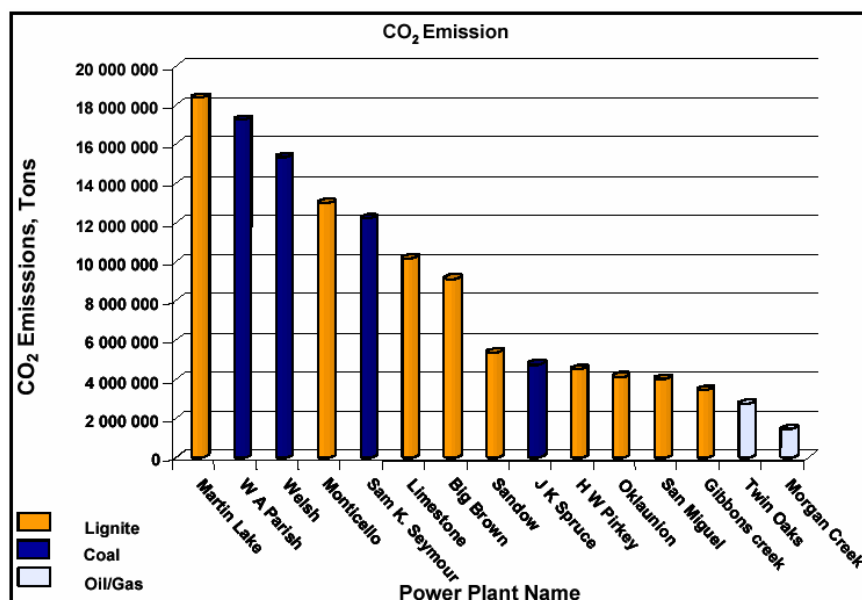
- Determine the technical and economic feasibility and volume of CO₂ that could be sequestered in Texas coal seams.
- Determine locations and quantities of anthropogenic CO₂ sources near possible coal injection sites.
- Determine the potential for enhanced coalbed methane recovery as an added benefit of sequestration.

Accomplishments

Potential sites for geologic sequestration of CO₂ with possibilities for enhanced recovery of coalbed methane near three of Texas' largest power plants have been developed. As an example, on the basis of preliminary reservoir simulation at one site using assumed permeability, it was estimated that the Gibbons Creek power plant could sequester all the CO₂ it generated for 11 years using 360 injection wells in nearby low-rank coal seams while producing 180 billion cubic feet of methane.

Benefits

Texas is one of the largest emitters of CO₂ in the U.S. However, Texas also has huge reserves of low-rank coal, and much of this coal is in deep seams in close proximity to large power plants. Thus, there is great potential for sequestering CO₂ in these coal seams while simultaneously producing large volumes of coalbed methane to help offset sequestration costs. Such projects could make a significant contribution towards meeting the goal of reducing greenhouse gas intensity (pounds of CO₂ emitted per dollar of GDP) by 18% by 2012.



Amount of CO₂ emitted and fuel type by power plant, 15 largest Texas CO₂ emitters.